Dr. Richey of Chicago University Making Notable Progress.

# SUPERIORITY OF METHOD

Study in Astronomy Greatly Facilitated by It.

Marvelous revelations concerning seavenly baodies and wonderful photo graphs in the world of stars, moon, no such remarkable results. His achievements are widely known among astronomers and his writings in scientific jourpals have been many, says the New York

Mr. Ritchey believes that astronomical chotography despite the wonders atready to his credit, has scarcely passed beyond constructing at the Yerkes Observaable to photograph stars fifty times faint-Yerkes Observator

That the splendid magnitude of the put in photographic sight of astronomers, Mr. Ritchey's plans prove successful, will contain new worlds and disclose remarkable celestial objects, few scientists Already Mr. Ritchey has taken photographs of stars ten thousand times fainter than the faintest now visible to the naked eye.

It is, too, Mr. Ritchey's suggestion. though by no means his firm bellef ,that spinning through space are perhaps other anets in a similar state of evolution to the earth and likewise inhabited. Whether the people of this planet by any means the hidden mysteries of the astronomical palverse Mr. Ritchey will not even sug- Ritchey bases much of his hope for fu Few astronomers do not hesitate to say that under the new revelations which astronomical photography doubtless holds for the future it is likely that problems in the evolution of the starry universe may be solved that now are per-

haps but half greened at. Mr. Ritchey was in New York last week at the Academy of Sciences. Friday night he spoke at Vasaur and will soon deliver lecture before the girls of Wellesley College. While in town Mr. Ritchey.

only about twenty years, although there was some important pioneer work done nearly forty years ago by Henry Draper and Lewis Rotherford, of this city. By old visual method they must be meaattached to the telescope at the time of re observation. Where it might take every night, with good atmospheric conditions. and measurements by the old method, show that the nebulae are not diffused bow a photograph can be taken in one heav masses, but that their structure is

assert that photography has superseded tersections of such filaments and rifts can JANUARY 2, 1983. the visual method in all kinds of as- be set in the measuring machine with altranomical work. Each method has its most the same accuracy that is possible ROUND TRIP, minimum selling rate of particular field of usefulness and each in the case of star images. Changes of to cents to be observed. For further insupplements and stimulates the other, form of the nebulae, if such occur, could formation call on or write The visual method is still superior in be detected with certainty by such phomany lines. In the study of bright heav- tographs, enly bodies, such as the most planets. There can be no question in regard and double stars, because of their bril- to the superiority of the photographic

by the greatest relaccope. Photography depicts with accuracy heavenly bodies now constructing a five-foot reflector. In astronomical photo-wick county tank city property or Sedgwick county tank at present prices means large county tank at present prices means the greatest reflector in astronomical photo-wick city property or Sedgwick county tank at present prices means the great reflector in astronomical photo-wick city property or Sedgwick county tank at present prices means the great reflector in astronomical photo-wick city property or Sedgwick county tank at present prices means the great reflector in astronomical photo-wick city property or Sedgwick county tank at present prices means the great reflector in astronomical photo-wick city property or Sedgwick county tank at present prices means the great reflector in astronomical photo-wick city property or Sedgwick county tank at present prices means the great prices means th which are beyond much of investigation by any other means. Much more
accurate details of constellations can be
obtained by photography than could formerly be obtained by inaccurate drawings
made after years of observation.

One of the most important things that

makes he districted mans of his investigations of the most important things that

nstronomical photography has lately done was to discover shout a year ago the has photographed the great metalla in the photographed the great metalla in the chickens: 12 premiums last three searches burned to the photography of three boars.

Cygnes with an expansive of three boars. By phonegraphy a nicholin was discov. The faintest stars shown in the original kinds tells, and by comparing them if was ten thousand stars to a plate eight by seen that the nobula changed its form ten inches, a picture showing the jumn elations, what wonderful new worlds and history of astronomy had a pebula been and 18,000 feet deep; pictures of comets only the future can tell

studying colestial objects.

In this connection it is interesting to see some photographs which Mr. Ritchey has made of the central parts of the great mebulae in Andronnela and to compare them with drawings of the some media rande years ago before the advented parts of the some media rande years ago before the advented parts of the some media rande years ago before the advented parts of the some media rande years ago before the advented parts of the some media rande years ago before the advented parts of the some media rande years of before the advented parts of the some media rande years of before the advented parts of the some media to compare the some and the some media the some media that if the nebula did change in the days years at the last two decades. Some the media is the rection of the sum of the some a cold yellow body, desouth as the some and the

ength of the 40-inch telescope at the Yorkes Observatory is 64 feet. It is rected in a ninety foot dome, which can may look out in any desired direction. The Yorkes Observatory's big telescope primarialy for the visual study of the nivens, but to use it for photographic arposes no camera attachment is requir-The telescope itself, with its lens and focal length of sixty feet, acts as the camera. The telescope is regulated by Oklahoma Day Express. 5 Earm oklahoma Day Express.

andy the apparent course of the heavenly bodies perose the sky. But to insure ab-solute accuracy, it is essential that dur-ing the time of the photographic plate's aposure, an astronomer should be staspecture, an astronomer shall be been as the telescope to correct by hand my minor deficiencies in minutely following the passage of the stars and celestial com. Trusday, Thursday and Saturday ng the passage of the stars and celestial To regulate so carefully a telescop

To regulate so carefully a telescope weighing seven ions became a problem of great difficulty. Mr. Ritchey solved the question by inventing a double side plate to the characteristic behavior of the characteristic plate in Friday. mich the astronomical linage is to be upused. Minute corrections are now side by governing the movements of the late rather than the telescope,

Another difficulty was that a refracting estrument constructed for visual puroses has its jens corrected in such a way that the yellow rays of light which aftert the eye must intensely shall be brought to a sharp forus, neglecting that his rays, which are most active photographically. A visual telescope is there fore far from adapted photographic purcass, insemuch as the yellow rays foussing at one point in the tube and the blue rays focussing at another point superimpose two images on the plate to be

It was found that a photograpphic plate could be made especially sensitive the experimental state. He thinks that perfected a yellow color screen which is with a new reflecting telescope which he placed just before the plate. It lets into low image and shuts out the blurred rays er than those now visible in the 46-inch of light in the photograph with retract refractor in the great telescope in the ling telescope the fainter of the stars and chulae an exposure of from three to five hours is necessary and then only is wondrone new universe which will be possible under the most atmospheric con ever, because of its brilliance and comparative proximity to the earth, an expos ure of half a second is all that is re juired.

Mr. Ritchey has some very interesting pictures of the moon's entire surface taken on such a big scale that the whole set of photographs make a 100 foot photograph of the moon. The pictures on

within sixty miles of the earth. So much for the work that Mr Ritchey has done with the refractor telit is on the reflecting relescope that Mr

For eighteen years Mr. Ritchey has een working on a reflector, but it is or in the last six years that he has be able to develop his ideas on a large scalwith remarkable success at the Yerks and lectured at Columbia University and there is no lens used at all. There is imply a highly pollshed silvered glass mirror, which reflects the image to the nsitive plate. The chief advantage of the reflector is that it brings all rays of consented to talk to me in regard to the light of whatever wave length to the of blue or yellow images. In the reflecto at Yerkes Observatory the mirror is two of cight feet. This type of instrument Mr. Ritchey finds, is the best possib photographing the heavenly bodies as- ing the brighter celestial objects, such in tronomers are embled to study and mea- the moon, the forty inch refractor is the sure them at their leisure, while by the better instrument, merely because its for cal length is eight times greater than the sured by the micrometer, an instrument | eight foot focal length of the two foot

"With the finest atmospheric conditions." Mr. Ritchey said to me, "photofor a year to make certain observations graphs taken by the two foot reflector fibe night, and from it measurements and most complicated often consisting of exobservations may be recorded at leisure. | quisitely time fliaments and delicate nar-It is a mistake, Mr. Ritchey says, to row rifts. In these photographs the in-

hance. It is possible to see smaller de-tails through the telescope directly than lection of such changes and for the study can be photographed. In the study of of the nebulae in general, . . . experience faint bodies astronomical photography gained in the construction and use of has afforded wonderful revelutions and this instrument and the results obtained with it are most interesting to me as Photographs can be taken of faint stars showing the possibilities of the future and nebulae such as are invisible to the great reflector in astronomical photo-

depicts with accuracy heavenly bodies new constructing a five-foot reflector,

One of the most important things that which he illustrates many of his fectures. Barred Plymouth Rocks known to do this. This, therefore, is with thin, all on one plate; of star clins-at least one frimuph that can be not down to the credit of the new method of group, so closely massed that their in-

to come, such changes much in the days years as in the last two because. Some than the major is not reasonable again, that are with his the prescriptions of aeronomical photo- while to suppose. Mr. But hey suggests drawings as a basis of compared in the property of the drawing with the most on photograph, in its remember and in cost with the may be planets in a state of develop-Where the drawing is crude inaccurate, great visual triscopes. That such a place ment similar to that of the one an which Clarse, the photograph is perfect in any transfer to the copy can be built as effective and the photograph is perfect in any terraphs releases can be built as effective and the live and there is the transfer at the copy can be built as effective and the live and there is the live and there is the copy can be live and there is all worder. The Archer Observatory of the trib.

The Archer Observatory of the trib. In the Archer of the Archer Observatory of the trib. In the Archer of the Archer Observatory of the trib. In the Archer of the Archer Observatory of the trib. In the Archer of the Archer of the Archer observatory of the Archer of the Carlo.

The Archer of the Carlo. Archer of the Archer of the Archer observatory of the Archer o The strength of the strength o world. The famous belomous in the Link, to proceed that the fifty from fainted more was once inhabited or not link and Texas. Takens to be seld that if Observatory, in California, has a 38-forth their are new at the lifting of wishing in the perhaps, Mr. Runbry concludes, the fig. November 4 and 15, December 2 and 16, Sees. The Lick Observatory, between, forty-forth visual refractor and to phehas an advantage is that the atmosphere icomph nebulae on a six times larger in which astronomical photography may March I and II, April 2 and II, 192. is clearer in California and from scale than before. What marvellous rev- play some part.

RAILROAD TIME-TABLE Special One-Way Atchison, Topeka and Santa Fe Ry. Second Class Colonist

Kansas City & Chicago Ex.

K. C. Colorado & Chiffernia Ex.

Weilington Accommodation

Caldwell Accommodation

K. C. and Chicago Express.

Panhandle Express

\*Englewood Branch\*Accom.

Leav Rate to the Southwest Texas Express
\*Englewood Branch Express...
\*Daily except Sunday. Wichita and Western. .11 00 a m

Railway. WEST BOUND

No. 2, Chicago Vestibuled Ex. 9 5 a No. 4, K. C. and Eastern Ex. 9 5 a No. 5, Daily Excent Sunday . 1 35 p

Missouri Pacific Railway.

Conway Springs and Coffeyville. Il 38 a m
For St. Louis 200 pm
For Kansas City & St. Louis 200 pm
Hutchinson, Lyons and Geneseo. 7 55 a m
Geneseo, Salina, Pueblo & Denver 5 00 pm
For Anthony and Kiowa 700 pm
Por Anthony and Kiowa 4 6 a m

Genesee 11 35 a m
From Futchinson 400 p m
From Hutchinson and Genesee 3 55 p m
From Anthony & Conway Springs 4 10 p m
From Klowa, Anthony & Conway
Springs 9 15 p m
Daily except Sunday.

Frisco Systam. EAST-BOUND

St Louis Mail & Southeastern
Limited 130 pm
St. Louis & Ft. Smith Express ... 10 15 pm
WEST-BOUND.

Kansas & Colorado Muli and Ex. 3 10 p n Meteor 8 S a n

The Choctaw Route.

Christmas and

Holiday Rates

One Fare for the Round

Trip

To any point within 200 miles of Wich-

TICKETS ON SALE DECEMBER 24

5, AND 31, 1902, AND JANUARY 1, 1903,

ONE PIRST-CLASS PARE FOR THE

I. R. SHERWIN, P. & T. A.

Missouri Pacific Railway, Wichita.

Established 1876.

Successor To

ISRAEL BROS.

Real Estate and Rents

WITH FINAL RETURN LIMIT OF

Ar. Oklahoma City... Lv. Oklahoma City... Ar. El Reno... Lv. El Reno... Ar. Weatherford ....

One-half of the one-way rate, plus \$2.00 o bertain points in Arkansas, Indian Perritory, Louisiana, New Mexico, Okla-Chicago, Rock Island and Pacific ber 18, December 2 and 16, 1962, January 6 and 20, February 2 and 17, March 3 and

> Homeseekers' Excursions, Round Trip

For full information, call on or write I. R. SHERWIN, P. and T. A. Missouri Pacific Railway Wichita, Kan.

# The Finest Train to California



# Golden State Limited

Strictly First Class. Paso 2:45 p. m. next day; reach Los An-C. E. BASCOM, C. P. A.

One-Way Second-Class Colonists' Rates



December 2-16, 1902, January 6-20, February 3-17, March 3-17 and April 7-21, 190 tickets to points in Arkansus, Indian Territory, Oklahoma, Texas and New way standard rate, plus \$2.90. For further information address B. F. DUNN,

Division Passenger Agent. R. G. NORRIS.

# Steamship Tickets to Ail Points On Earth



We sell through rallway and steamship tickets to all points in the world. carry in stock tickets of mearly all steamship companies. Below are a few. Fred W. Israel Real Estate Co. Holland-American Line, New York to

French Line, New York to Havre. Hamburg-American Line, New York to White Star Line, South Africa and

South America. Hamburg-American Line, New York to Liverpool North German Lloyd, New York and Galveston to Southampton, Bremen Genoa, Naples, China, Austria and

Mailory Line, Galveston to New York. Anchor Line, New York to Glasgow and Londonderry. Cunard Line, New York and Boston to

Allan Line, New York and Montreal any phonography a midule, was discovered which had never before been trained on the manifed ever can see the manifed ever the manifed ever can see Oceanic Steamship Company and Pacific Mail Steamship Company, Sen Francisco ands, Straits Settlements, India and Aus

from time to time. Never before in the crater Clavine, which is 162 miles wide extential objects may be discovered then through tickets and issue prepaid ticket orders via twenty-seven other steamship

L. R. DELANET, Ticket Agent.

## One Way Second Class Colonist Rates To the Southwest



L. R. Delancy, Agent.

E. E. HAMILTON, M. D. 128 East Dougler avenue (Bitting block, third floor). Take elevator at Market Practice limited to Eys, Ear, Nose and Throat.

J. G. DORSEY, M. D.

105 West Douglas Aveuns Practice limited to Diseases of the Eye Ear, Nose and Throat.

I FRANKLIN GSELL M. D. 112 East Douglas avenue. Practice limited to Diseases of the Eye Ear, Nose and Throat. Telephone numbers-Office, dence, 3 on 830.

J. C. BROWN, M. D.

Ear, Nose and Throat.

Over 148 North Main Street. Practice limited to diseases of the Eye

Dr. J.W. Shults Specialist

# Dr. E. H. Creditor DENTIST

I give my personal attention to all ork. Years of experience enables me o do satisfactory work. Most people deire their work done with premptness Extracting without pain, when desired (Gas or local anaesthetics.)

> Best Work for the Least Money

144 North Main Street

DR. H. L. SALISBURY, ...Dentist

Does the lest Dental work at the lowest rices. Teeth extracted without pain, or to pay, by the use of ricalized all, silver fillings . 30 linting fillings . 75 load fillings, up from . 30 leaning teeth, up from . 30 rech without plates. Bold crown 5.00

Rest set of teeth 5.00

Extracting with the air 55

Children's teach extracted free. All

Office, 139 North Main Street. Boston Dental Parlors,

Phil. Y. Strohecker, D. D. S. Proprietor

#### 405 EAST DOUGLAS AVE. Open evenings till \$:30. J. P. ALLEN

DRUGGIST Everything in drugs. Mail orders re-

108 East Douglas, Wichita

G. GERKING, DRUGGIST Choice Imported and Domestia Cigara

# From the Day Of Its Opening

but never before has it been so well prepared to meet and satisfy the needs of its pattons as not

### THE NATIONAL BANK OF COMMERCE OF WICHITA, KANSAS

Eisberry Martin, Caphier. C. Q. Chandler. President. E E. Masterman. Chas. Tiviard, Vice-President. Assistant Cashier. J. W. Berryman, Second Vice-President. THE KANSAS NATIONAL BANK

of Wichita, Kansas. Capital, \$100,000. (The Oldest Bank in Arkansas Vailey.)

L. S. Nafteger, W. R. Tucker, President, Vice-President J. M. Moore, Cashier. The Fourth National Bank United States Depository.

Capital \$200 000 Sarplus \$20.010 Directors-W. R. Tucker, W. E. Jett, R. L. Hoimes, B. F. McLaan, S. B. Amidon, J. M. Moore, L. S. Naftinger.

A general banking business transacted. Wichita, Kansas

Barber Shop and Bath Rooms

At 115 E. Douglas Ave. Bath rooms open on Sunday until 12 3. Frompt service. Everything first-class. J. B. THOMPSON Proprietor.

A. C. HUSEY'S ... ~ OMMERCIAL LUB ... Union

# Sickner Conservatory of Music

Chicat, largest and only chartered school of transc in Wichits. All, BHANCHE & Only the best methods of modern technique taught.
Ruchals given every fitting of the year.
Sindents may enter at any time. Indicate may enter at any time. Terms resemble. Send for extalogue. A. W. SICKNER, Director,

Phone 696. 007 East Douglas Ave. THE LEADING COURSE BY School of school CORRE-OF THE SPONDENCE. RTATE A treeful and valuable Xmas gifting

Mrs. Abbie T. Hays

Principal. In The Sedgwick. Wichita Union Stock Yards Co

Capacity: 3 000 Cattle 5,000 Hogs W. R. DULANEY, Superintendent of Stock Yards

age and City Water. All Pens Covered, Private Yards for Texans, Perfect Sewes

Casey & Garst Mercantile Co. WHOLESALE CIGARS, TOBACCO, CANDIES
AND GROCER'S SUNDRIES
Distributing Agents for Cub an Sprig and Crarina Cigars.
Wichita, Kannas.

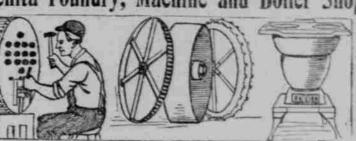
Cigara. Wichita, Kansas.

B. F. McLEAN Lumber

Dealer

YARDS AT WICHITA, KANSAS. CLEARWATER, KANSAS. CHENEY, KANSAS. ARKANSAS CITY, KANSAS PECK, KANSAS.

512 WEST DOUGLAS AVENUE Wichita Foundry, Machine and Boiler Shops



All kinds of Boffer Sheet Iron Work done. We have recently equipped the shops with new machinery and enlarged them to double their former size. We guarantee satisfaction and prompt service. Give us a trial. 118 North W Ichita Street.

The Pratt Lumber Co. Established in 1875.

## A Home For Christm a

imber such as we supply is certain to be s comfort-giving use for many a Christnas thereafter. Don't place your lumber orders anywhere until you've been through our yards, seen our stock-then you won't buy elsewhere than here

Corner First and Lawrence. 'Phone 77.

WICHITA JOBBING AND MANUFACTURING HOUSES WALLENSTEIN & COHN Wholesale Milliners, 233-5-7-9 South Main street, 103-5-7-9 East Douglas avenue, importers and designers.

LEHMANN-HIGGINSON GROCER CO. Corner William street and Santa Fe avenue.

JETT & WOOD Wholesale Grocers. Corner Santa Fe avenue and William street.

WICHITA WHOLESALE GROCER CO. Sell everything in the grocery line. Popular brands of Cigars. Corner of Santa Fe avenue and William street.

McCOMB BROS. Wholesale Saddlery. Manufacturers of Harness and Saddles. 401 East Douglas avenue.

L. HAYS SADDLERY AND LEATHER CO. Manufacturers of Harness and Jobbers of Saddlery. 125-127 W. Donglas

THE PERU-VAN ZANDT IMPLEMENT COMPANY. Wholesale Farm Machinery, Threshers, Plows, Shellers, Vehicles, Etc. Sample rooms 123, 125, 127 North Water street. Phone 350. J. A. BISHOP

Wholesale Dealer in Paints, Glass, Varnishes, Paint and Varnish Brushes. Largest stock in the state. 205 North Moin street.

Hides, Fars, Pelts and Tallow. Call up long distance 'phone 207. We pay Eagle quotations. No commission charged. NIN E. BURRUS

Manufacturer and Jobber of Cigara. El Campo Cigar, 10 cents; Star Fives Cigar, 5 cents. 120 North Market street. GEORGE WETTERHOLD facturers of all kinds of Mattresses, Pillows and Excel sior. Factory corner Kellogg street, from Fourth to Fifth avezues

THE AYLESBURY MERCANTILE CO. Wholesale Grocers, corner Third street and Santa Fe avenue. Telephone 229.

H. B. ALLEN BOTTLING WORKS Manufacturers of Allen's Norwich Pop." High Grade Ginger Ale and Milk Shake Syrups. 316 East William street. Phone 517. S. D. SHAW BARBER SUPPLY CO.

We handle a full line of August Kern Goods, of St. Louis, 317 East Douglas avenue. ROSS BROS. Wholesale Seed and Commission Merchants. 309 East Douglas avenue.

Mantels, Grates, Cement Plaster, Lime, Hair Plaster, Asteston, Fire Brick, Fire Clay, Cement, Color Mortara, 143 North Water street, ARKANSAS VALLEY FENCE CO.

Combination Farm, Garden and Ornamental Fencing and Portable Corn Cribs, Union Hog Fence, Poultry Norting, Etc. 139-132 N. Water street. THE HOCKADAY HARDWARE CO. Exclusive Wholesnie. Shelf and Henry Hardware, Tin and Enamels ! Wares, Ammunition. Long Distance Phone 491.

CHAS, LAWRENCE Dealer in Photographers' Supplies. 219 East Douglas avenue. Telephone connection. AMERICAN CORNICE WORKS

Fred Buckley, Proprietor, Manufacturers Sheet Metal Curnice, Hay-lights, Tin. Copper and Slate Roofing, Gettering, Spouting, Phone 512. ELECTRICAL SUPPLY AND CONSTRUCTION CO. Everything Electrical. Phone 296. 127 North Markot street.

THE C. E. POTTS DRUG CO. Exclusive Wholesale Drugs, Medicines, Chemicals, Paints and Pine Cigars. 117, 119, 121, 123 North Santa Pe avenue. WICHITA PUMP FACTORY AND MACHINE SHOPS

Walterscheid Bros., manufactur ers and jobbers of Iron Fumpe. Wind Mills. Galvanized Steel and Wood Tanks, Automobiles and Huppiles. Pipe Fittings, Belting and Hose. Machine and Boller Work our speclaity. Casting to order. Automobiles repaired. 114-14 North Head Avenue. Phone 115

THE WHITNEY PAPER CO. (Incorporated.) Wholesalers and Printers of Wrapping Paper and Paper Hage, 177 North Santa Va Avenue. WICHITA STOVE AND IRON WORKS

Ideal Stoves. Architectural and Structural Iron Works. Steel Bearns in stock. One block north Union deput. Phone 123. MOORE DRUG CO-WICHITA SURGICAL AND DENTAL DEPOT Wholesale Drugs, Surgical Instruments and Bental Supplier. 216 Hast Douglas avenue.

Manufacturing Opticians. Dealers in Watch Material and Jewelers' Findings. Watch work done for the trade. Leaves ground and Frames made to order. 126 N. Main street, rooms 7 and 10, upstairs.

Wholesale Queensware, Glassware and Fancy Goods. 414-618 East Douglas avenue.

AMERICAN SODA AND BAKING POWDER CO., MANUFACTURERS 147 North Emperia avenue. M. S. Dowden, Jr., Manager. Blue Bibbon Brand Baking Powder, High Grade Coffees and Sproof. Refract Player-ing in bulk. Coffee Urns and Mills, Bodz Fountains. Vivegar, Ciders and Bakers' Supplies.

WESTERN SUPPLY HOUSE, C. A. Ryno, Manager,
Wholesale and Retail Lime, Halr, Lumber, Mill Work, Plate and Window Glass Cast and Steel Beams, Columns, Coment, Actua Planter and Finish, Mortar Colors, Brick and Stone. 133 and 135 N. Water,

Phone 542 THE WICHITA AND EAGLE CORNICE WORKS Manufacturers of Galvanized from and Copper Cornica. Tim. from and Slate Roofing. 126 North Lawrence avenue. Phone 695. WICHITA BROOM FACTORY AND BROOM SUPPLY CO.

All grades of Brooms and Whisps at reasonable prices. Dealers in Broomcorn and Broom Emppiles. Handles of best Michigan quality. Wire Twine Locks, Braces Nella Steples; also Tools, Write for prices, 1302-1368 Hunter avenue, R. S. Groves, Proprietor.

A complete line of Wholesale Notions, Whips, etc. \$17 and \$19 West Douglas Avenue. Phone 343.